Zebrafish Spawning and Reproduction From a Researcher's Perspective

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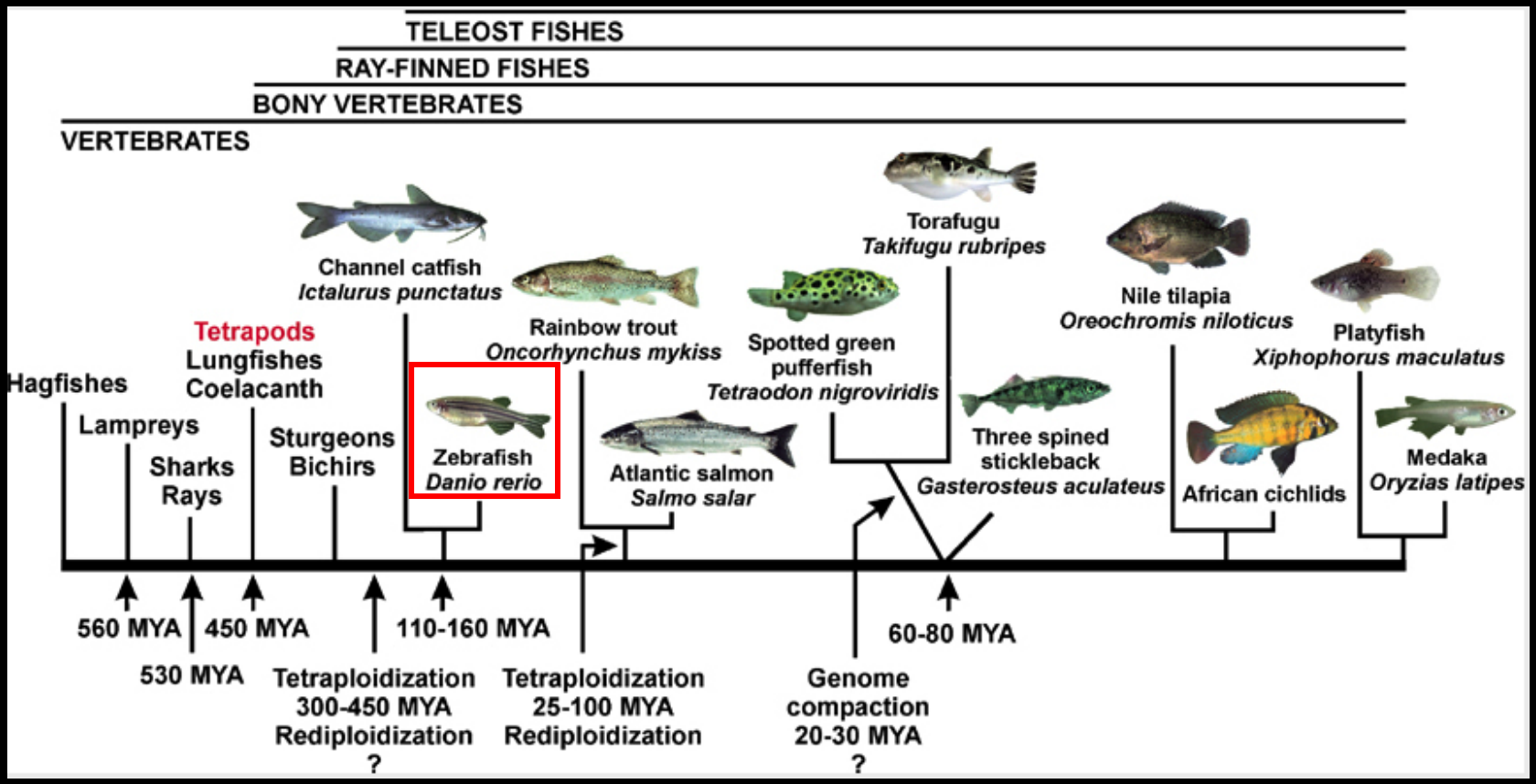
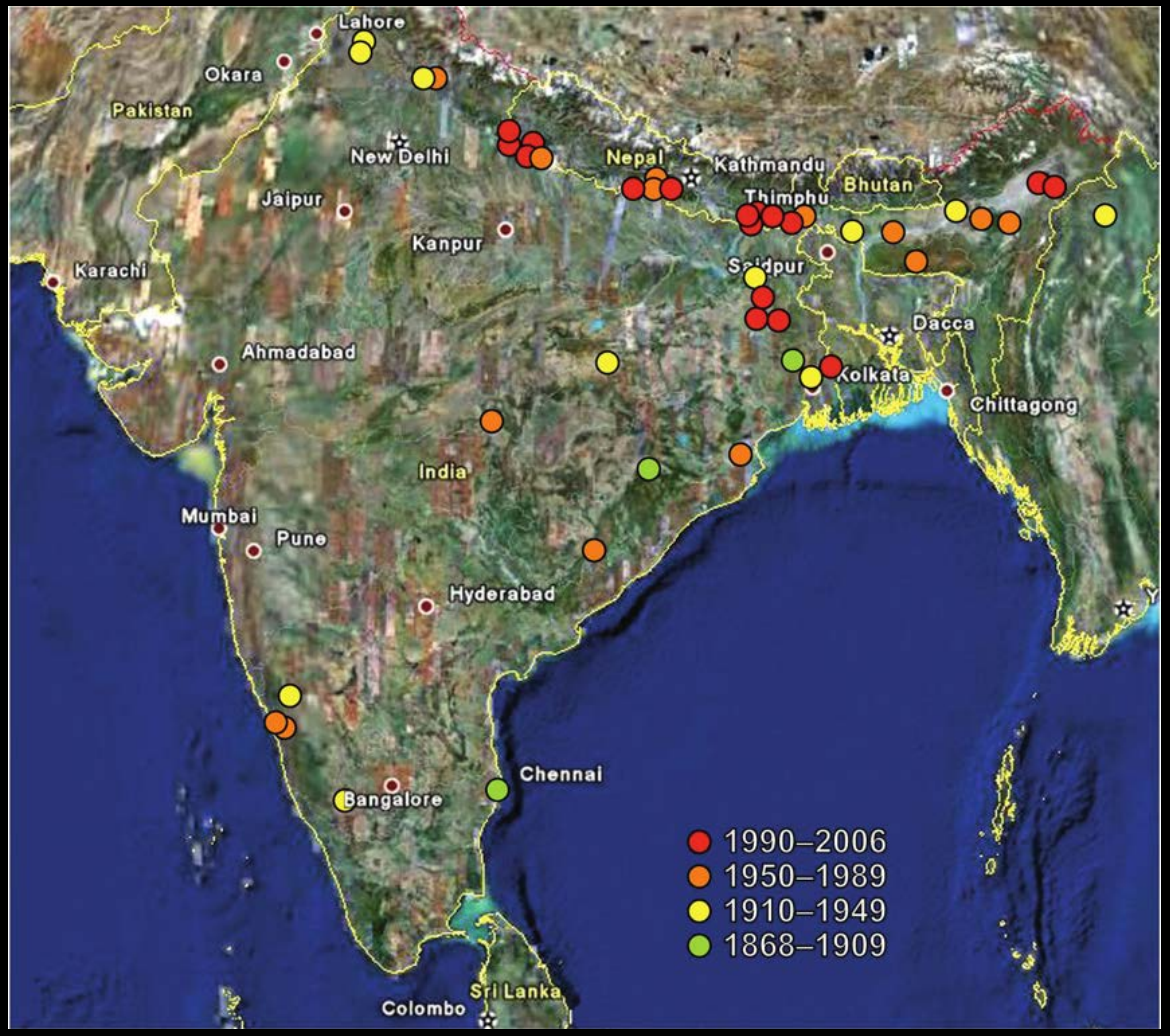
The Zebrafish

- *Danio rerio*



Genome evolution and biodiversity in teleost fish. J-N Volff. Heredity 2005. 94, 280-294

Where do they come from?



Zebrafish in the Wild: a Review of Natural History and New Notes from the Field. R. E. Engeszer et al. 2007, Zebrafish. 4(1) 21-40.

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Zebrafish in the Wild

- Prefer shallow stagnant waters close to rivers and streams
- Seasonal spawners (summer)
- Shoaling fish
- Omnivores
- Tolerate a wide range of water quality parameters

Zebrafish in the Lab

- Mainly used as broodstock
- Sexually mature around 3 months
- Spawn well from 3 months to 2-2.5 years
- Breed all year round
- Many different breading techniques

Breeding

- Off of System

Movie by Mark A. McElwain

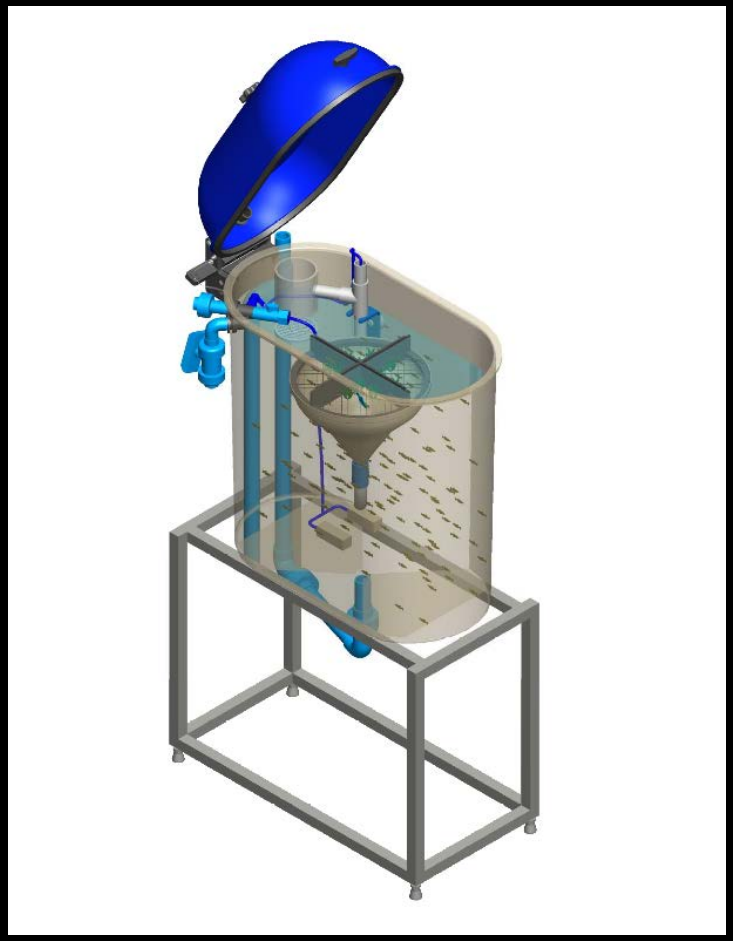
Separating Males and Females

Large Scale Breeding

- On System

  -MEPS (Mass Embryo Production System)

  By Aquatic Habitats



Large Scale Breeding

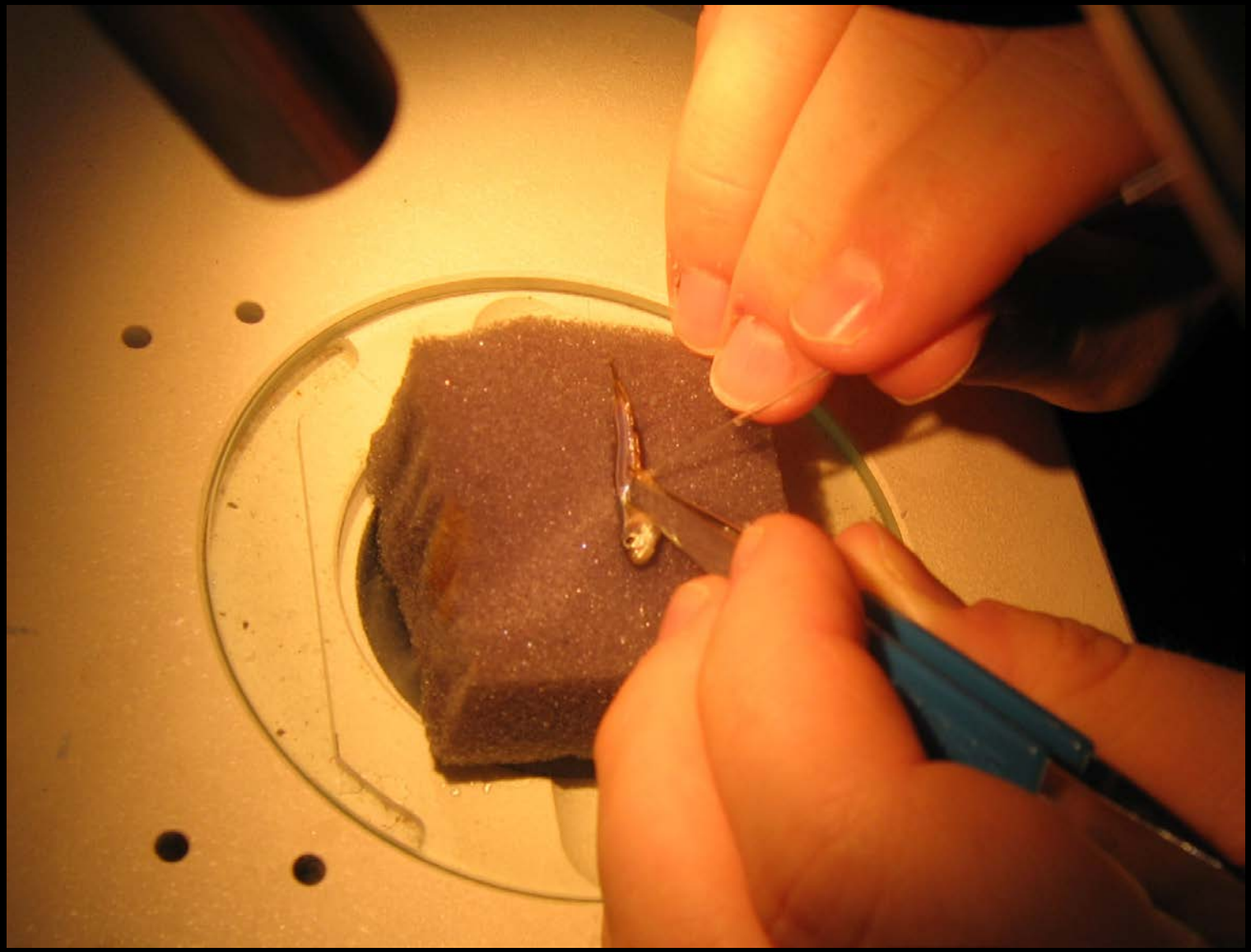
- Off System

  Designed by Issac Adato and Christian Lawrence, Distributed by Techniplast

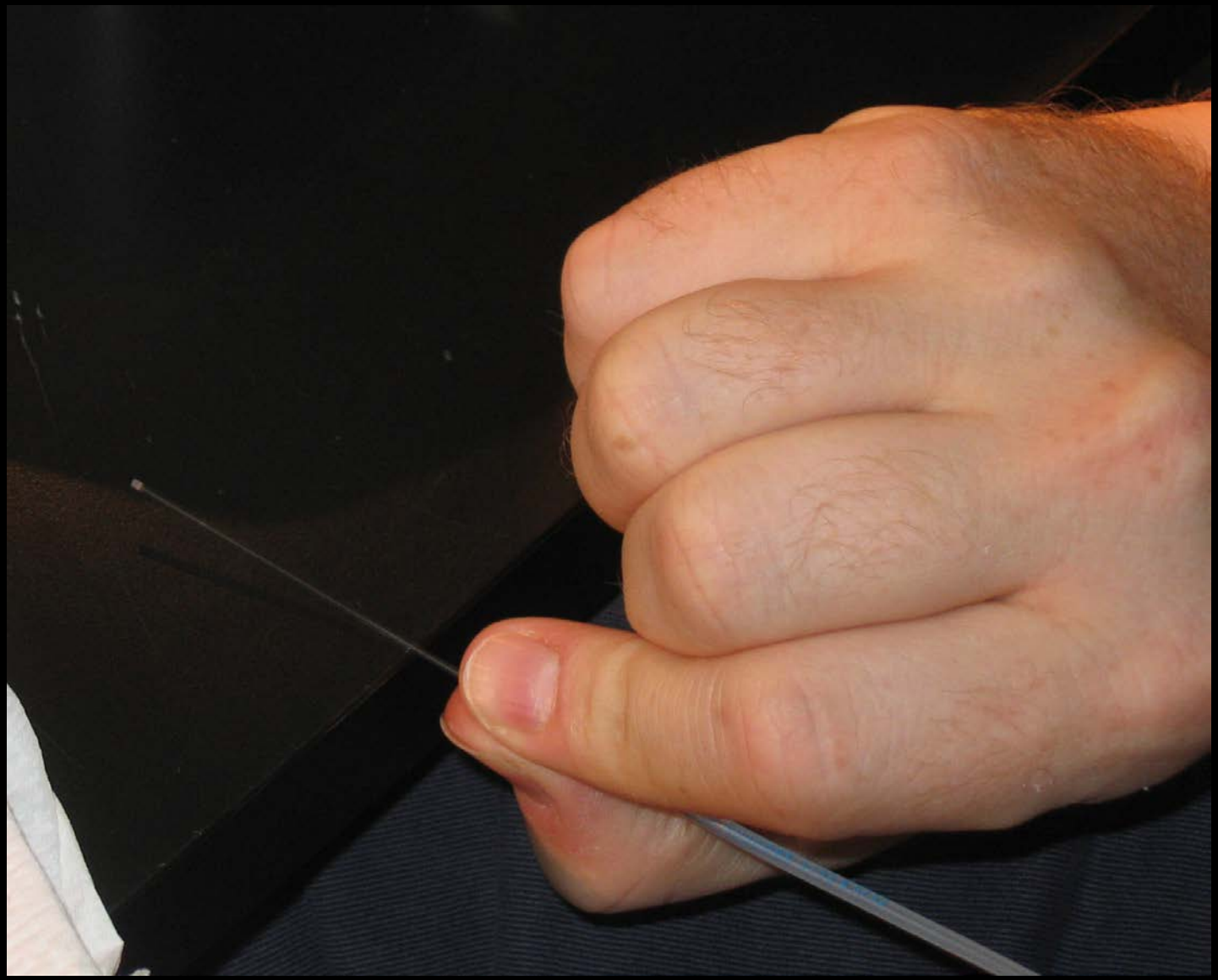
If they won't Cooperate… In Vitro Fertilization

- Older Animals
- "Compromised" Animals
- Synchronized Embryos
- Quarantine X Non-Quarantine
- ~ 10% Mortality Rate

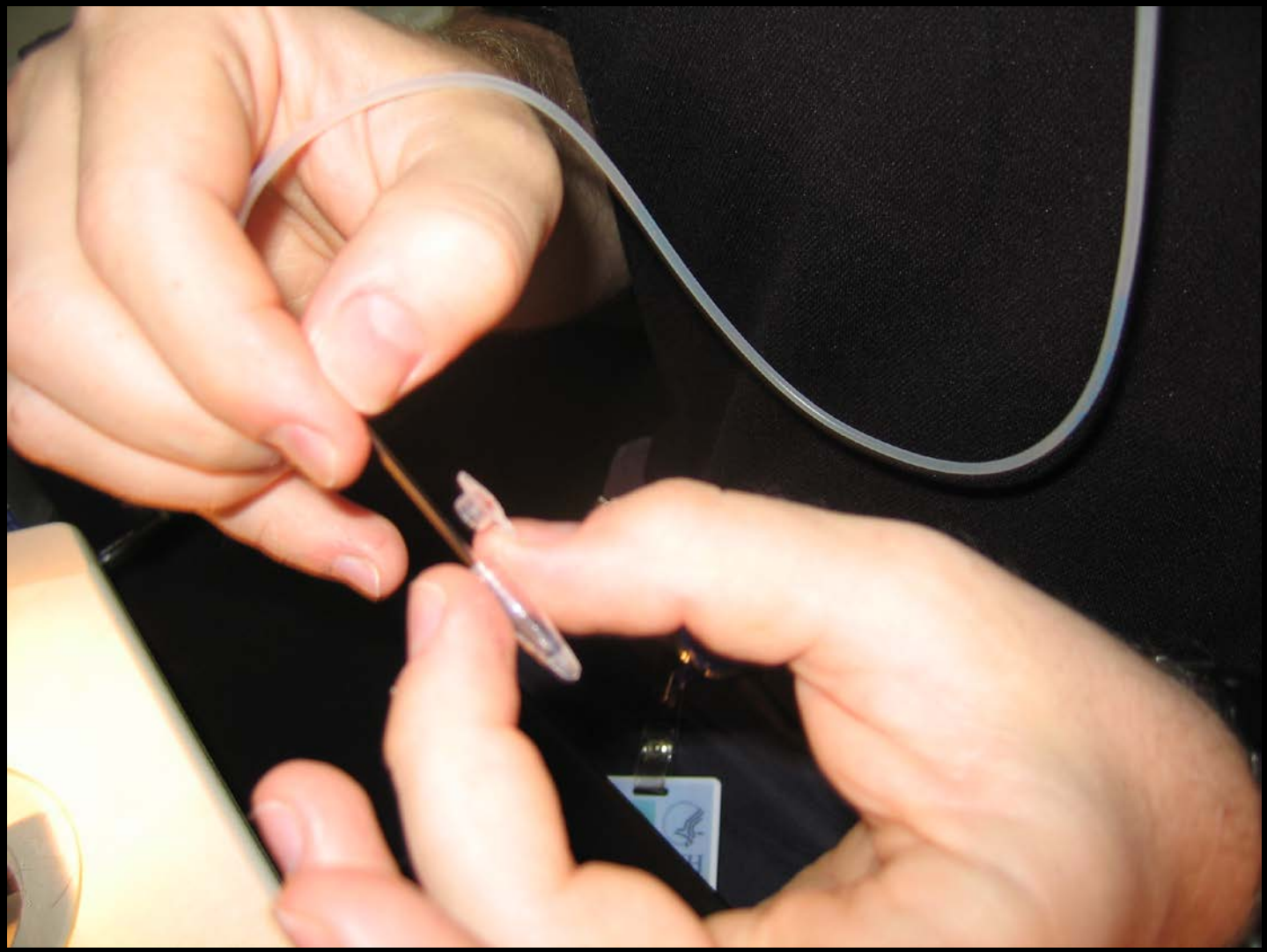
Mouth Pipette
Sperm from the Male



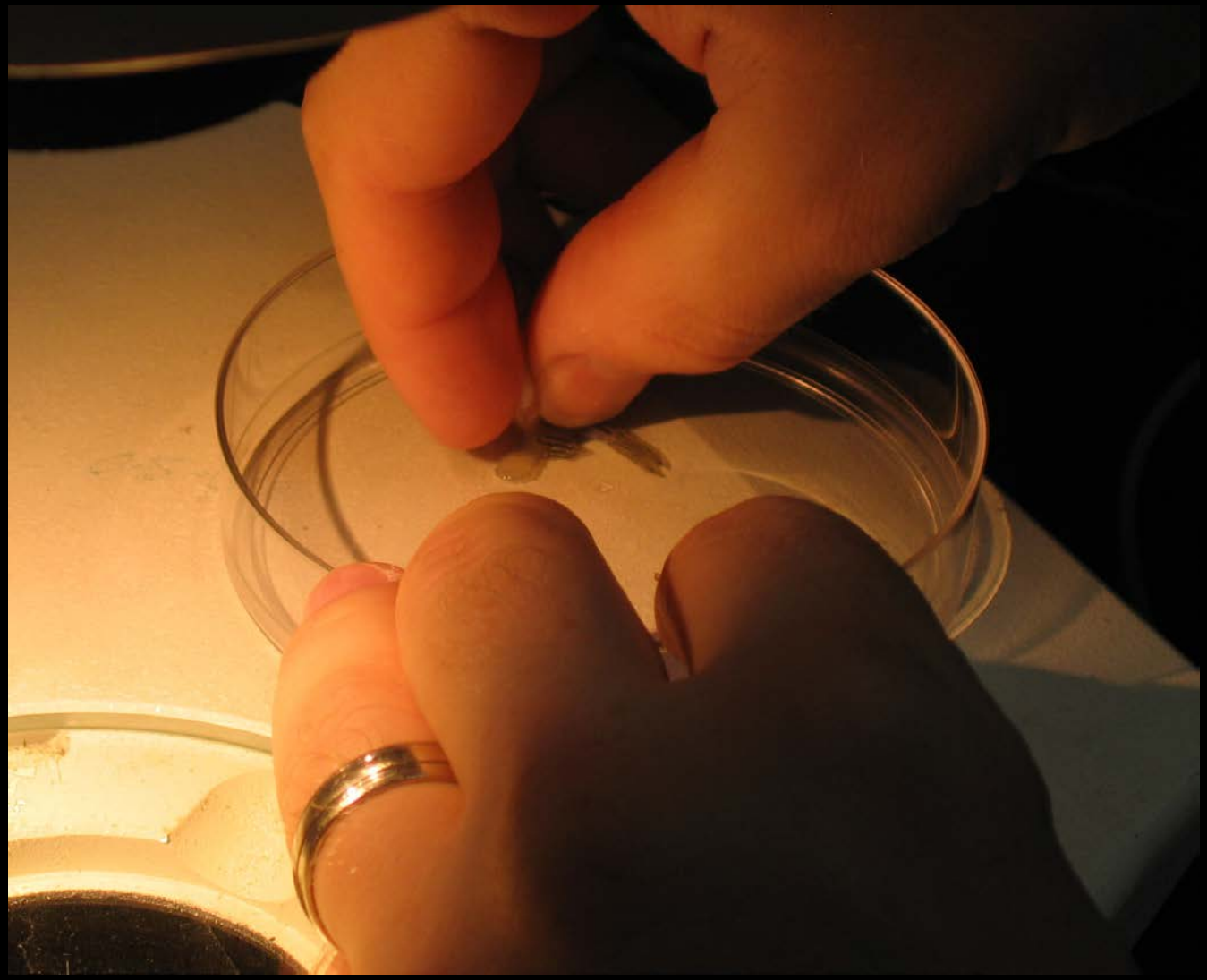
Sperm Sample



Dilute Sperm in Hank's Salt Solution



Squeeze the Females



Sperm on Egg

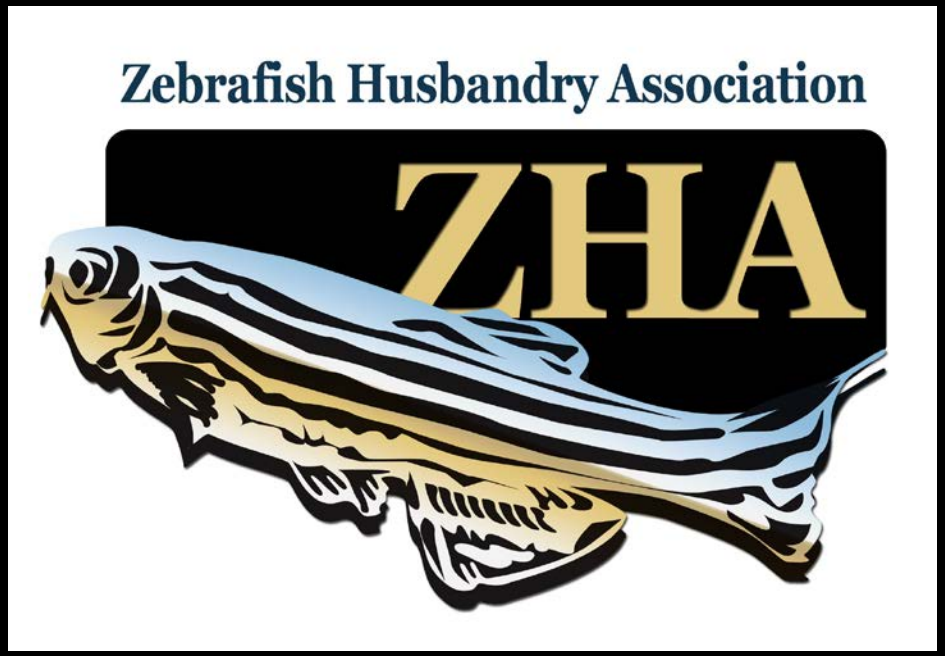
Just Add Water

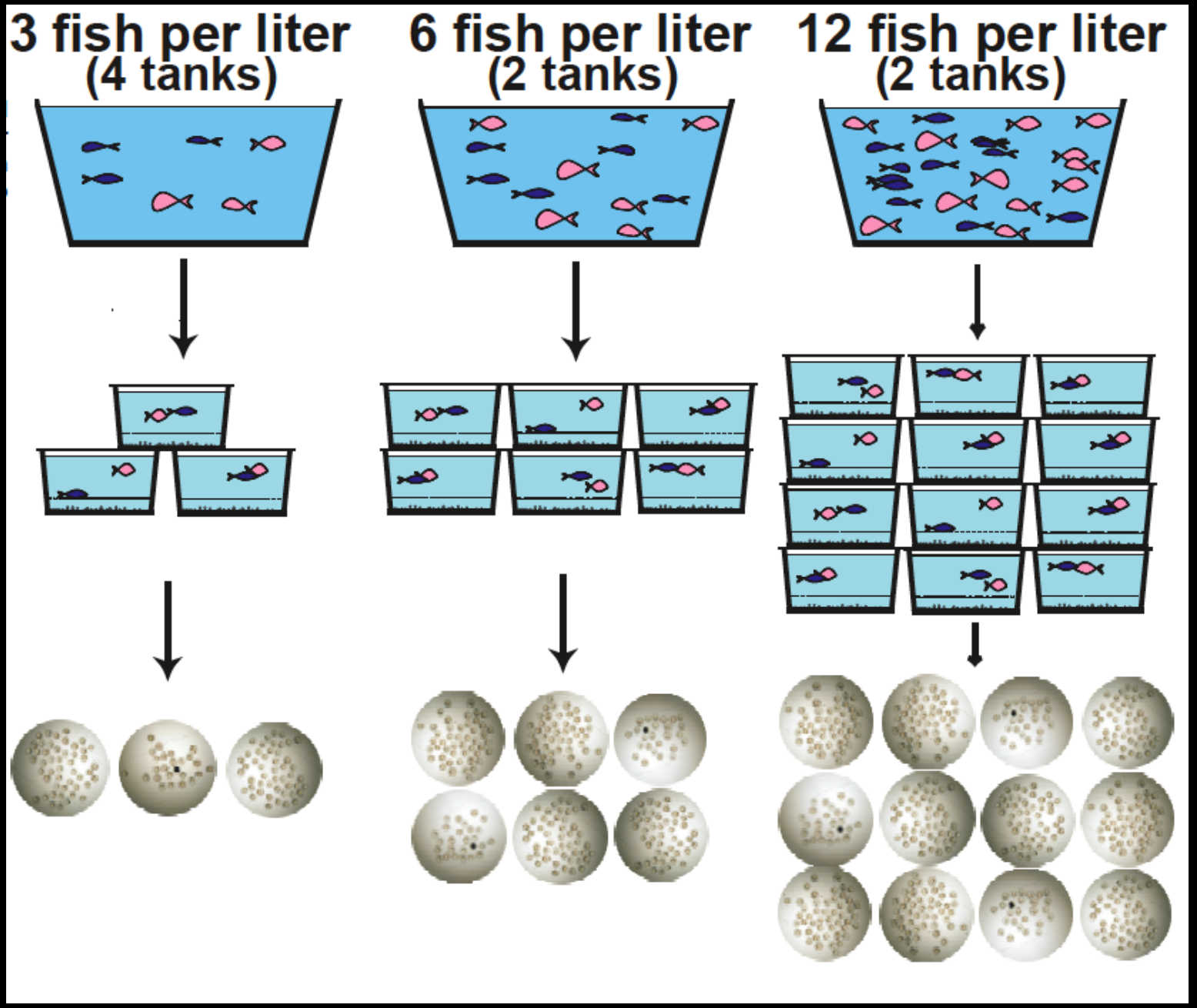
The next 17 hours…

Rolf Karlstrom and Don Kane; Development 123:461, 1996

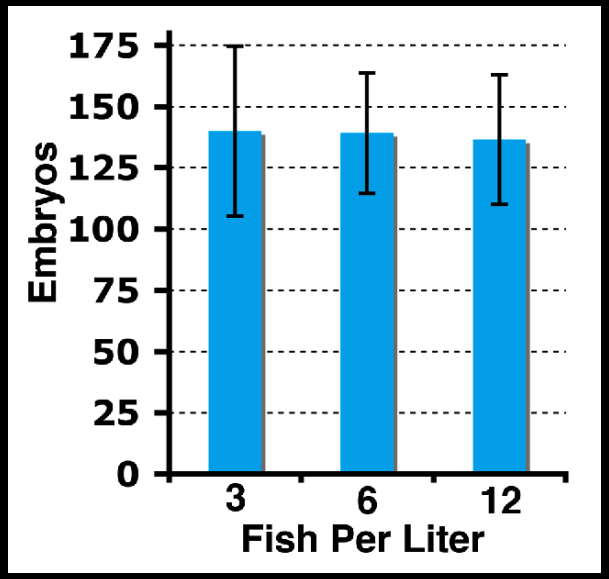
Improving Reproduction and Spawning

Insight from a collaborative research project organized through ZHA

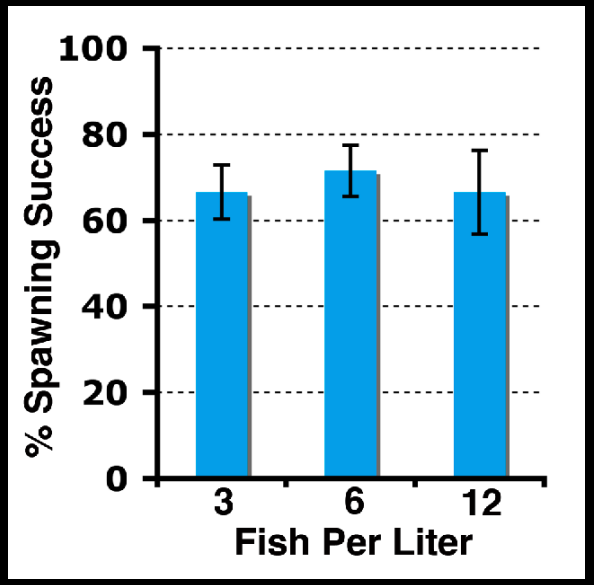



3 fish per liter
(4 tanks)
6 fish per liter
(2 tanks)
12 fish per liter
(2 tanks)

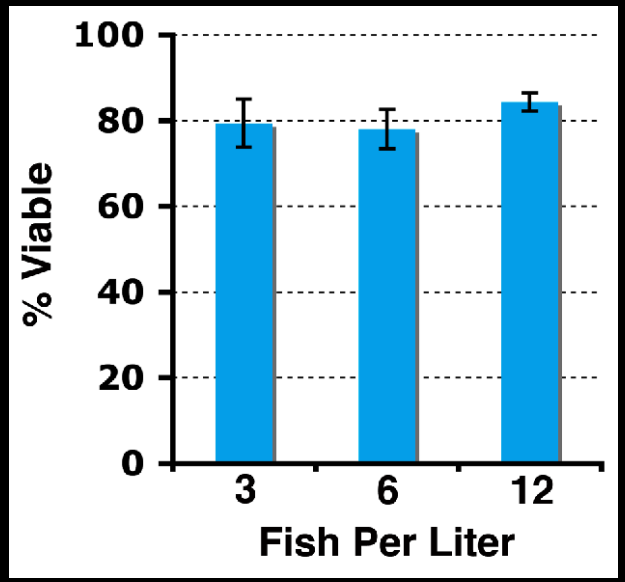
Average Clutch Size



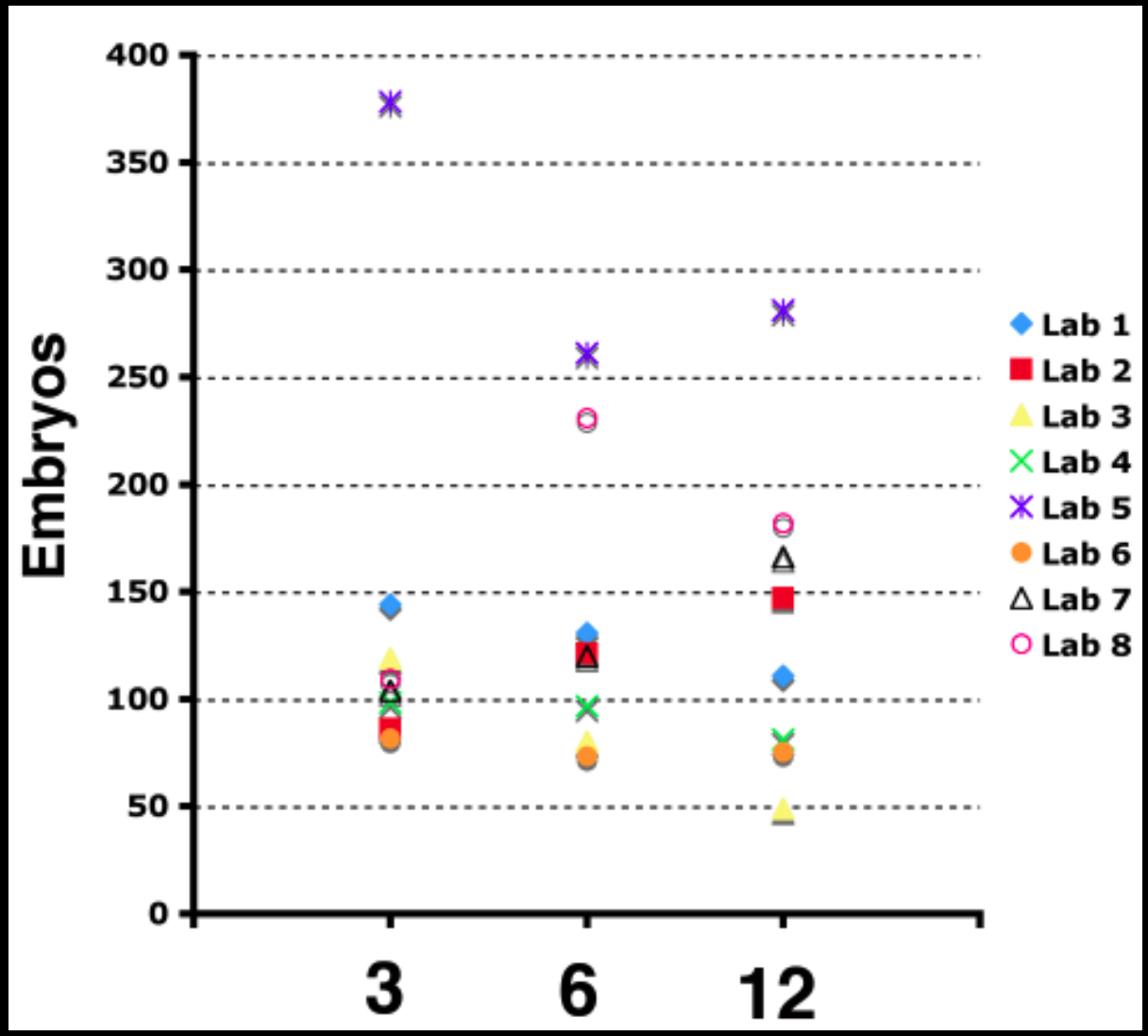
Percent Spawning Success



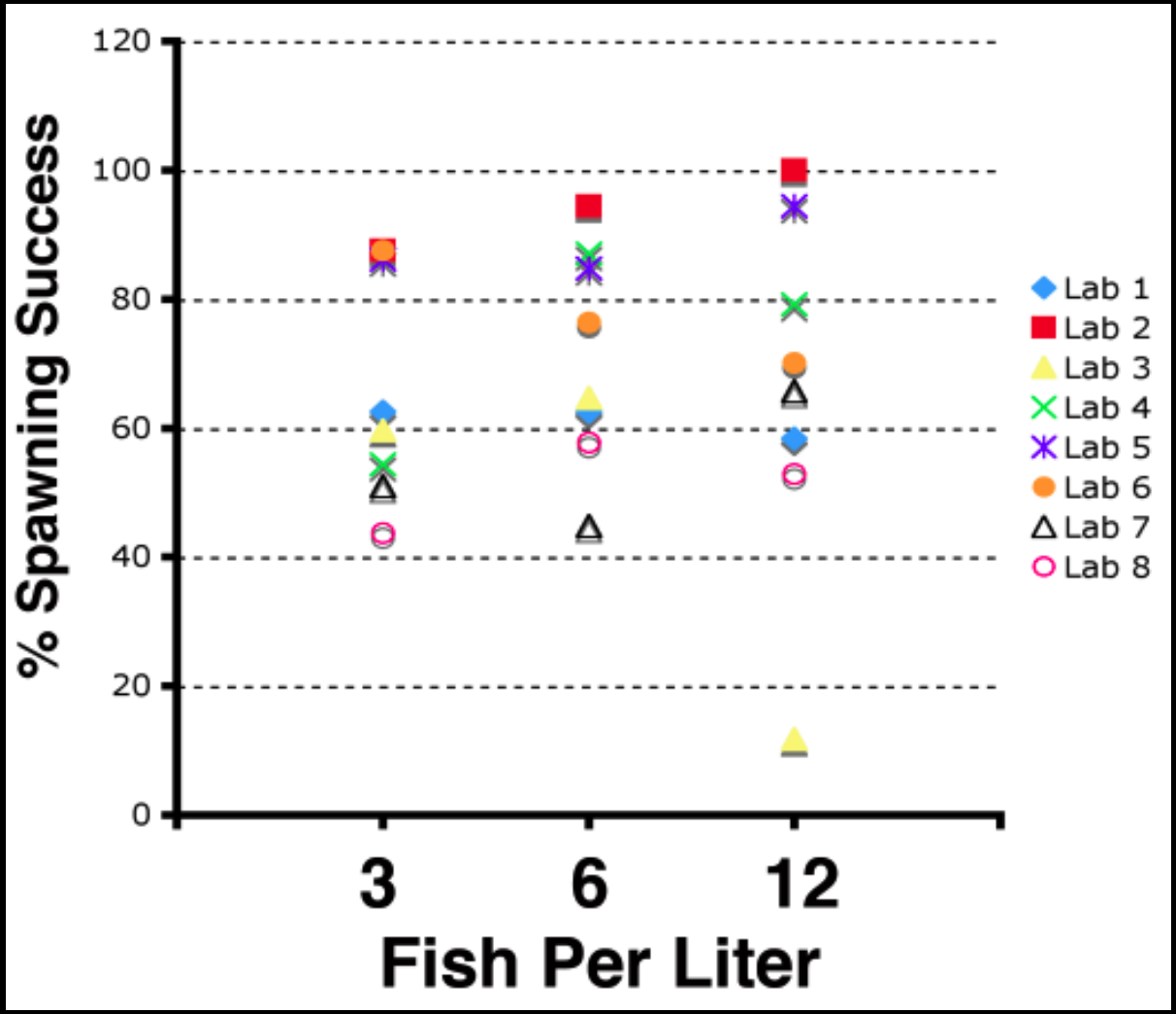
% viable at 1DPF



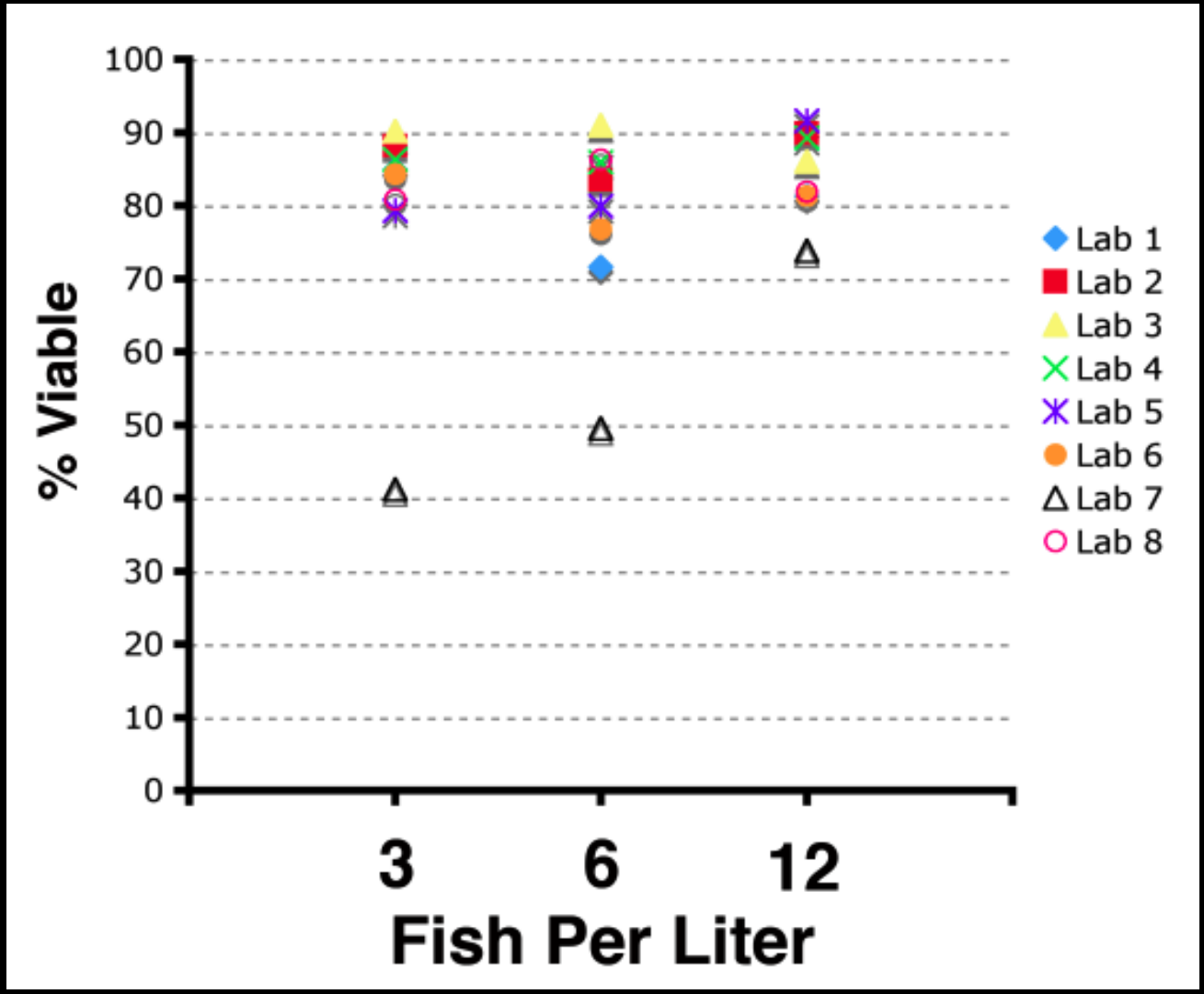
Average Clutch Size



Percent Spawning Success



Percent Viable at 1DPF



ZHA Density Study Summary

- No differences between treatment densities
- Great variability among laboratories

Keeping fish at densities as high as 12 fish/l doesn't have A negative impact on reproductive performance!

Acknowledgements

Working Group on
Spawning and Reproduction

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Questions?